

Headquarters U.S. Air Force

***I n t e g r i t y - S e r v i c e - E x c e l l e n
c e***

C4ISR Roadmap Overview

Shortening the Kill Chain Through Net Centric Ops



**Lt Col James “Magic”
Henderson**

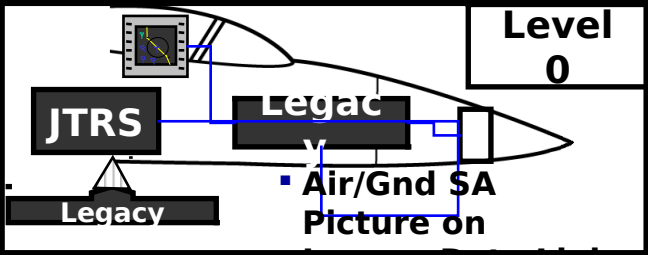
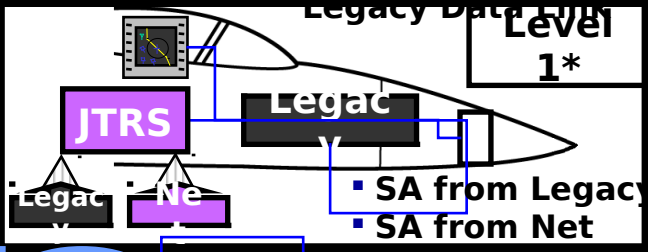
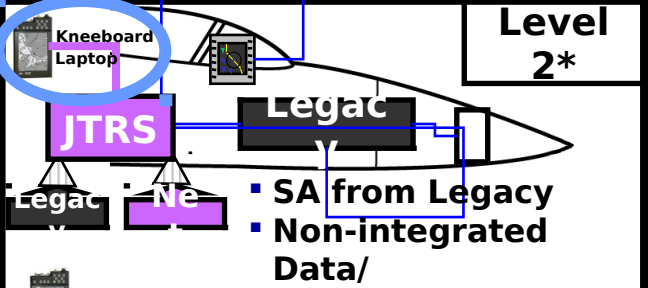
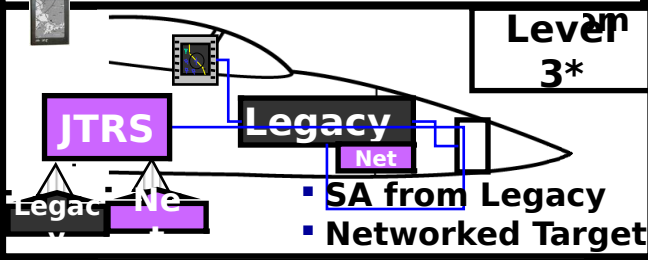
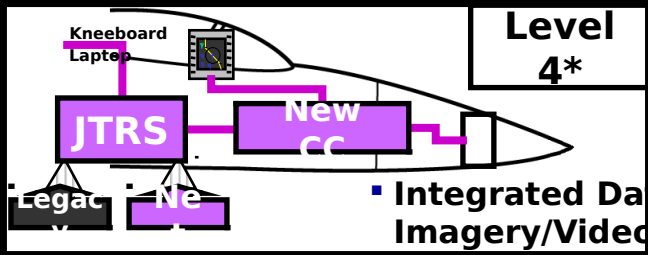
SAF/XCIE

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Levels of Aircraft Network

Enabling

| | | | |
|--|---|--|---|
|  <p>Level 0</p> <ul style="list-style-type: none"> Air/Gnd SA Picture on Legacy Data Link | <p>Computer Equivalent</p> <ul style="list-style-type: none"> 2400 Baud Modem No surfing <p><i>Platforms: F-15C etc.</i></p> | <p>Example</p> <ul style="list-style-type: none"> Link 16 Ground Track from Link 16 | <p>What You Get</p> <ul style="list-style-type: none"> Legacy IER JTRS Policy Compliance |
|  <p>Level 1*</p> <ul style="list-style-type: none"> SA from Legacy SA from Net | <p>Computer Equivalent</p> <ul style="list-style-type: none"> Send/Receive Word Documents from Net <p><i>Platforms: B-1, F-18, F-16, etc.</i></p> | <p>Example</p> <ul style="list-style-type: none"> Info from the GIG Info from Link 16 | <p>What You Get</p> <ul style="list-style-type: none"> Legacy IER M2M GIG Connected |
|  <p>Level 2*</p> <ul style="list-style-type: none"> SA from Legacy Non-integrated Data/ | <p>Computer Equivalent</p> <ul style="list-style-type: none"> Laptop with Cable access <p><i>Platforms: Global Hawk, Tankers, E-2</i></p> | <p>Example</p> <ul style="list-style-type: none"> Kneeboard Capability (E-mail, NIPR/SIPR, etc.) | <p>What You Get</p> <ul style="list-style-type: none"> Man-in-the-loop GIG Connected |
|  <p>Level 3*</p> <ul style="list-style-type: none"> SA from Legacy Networked Targeting | <p>Computer Equivalent</p> <ul style="list-style-type: none"> Net-meeting, Webcam, VTC <p><i>Platforms: E-10A, ACS</i></p> | <p>Example</p> <ul style="list-style-type: none"> AT3 Target Geo-location | <p>What You Get</p> <ul style="list-style-type: none"> Integrated M2M targeting collaboration |
|  <p>Level 4*</p> <ul style="list-style-type: none"> Integrated Data/Imagery/Video | <p>Computer Equivalent</p> <ul style="list-style-type: none"> Some Level of Bill Gates' House <p><i>Platforms: E-10, F-35, UCAV</i></p> | <p>Example</p> <ul style="list-style-type: none"> Fused Sensor information | <p>What You Get</p> <ul style="list-style-type: none"> Integrated M2M Network enabled data exchange |

**Limited Beyond Line
of Sight (BLOS)
comms**
Narrow
Bandwidth/Unprotected
Primarily Voice, Not Data

**Require Gateways
to pass
information
between closed
networks**

UFO (UHF) INMARSAT / IRIDIUM

Connexion /
INMARSAT

SPACE

VIP
Aircraft

**Airborne IP
capability primarily
for VIP Aircraft**

AIR

**Limited line of sight
data links for
specific
communities of
interest**

IDM

Link 16

Coalition (118 Kbps)
SEAD Aircraft

Fighter Aircraft

C2 Platforms
ROBE

ISR Platforms

UAV
S

CAS
Aircraft

EPLRS

Gateway

Land Mobile

SURFACE



Surface/Sub-Surface Mobile

GIG-BE

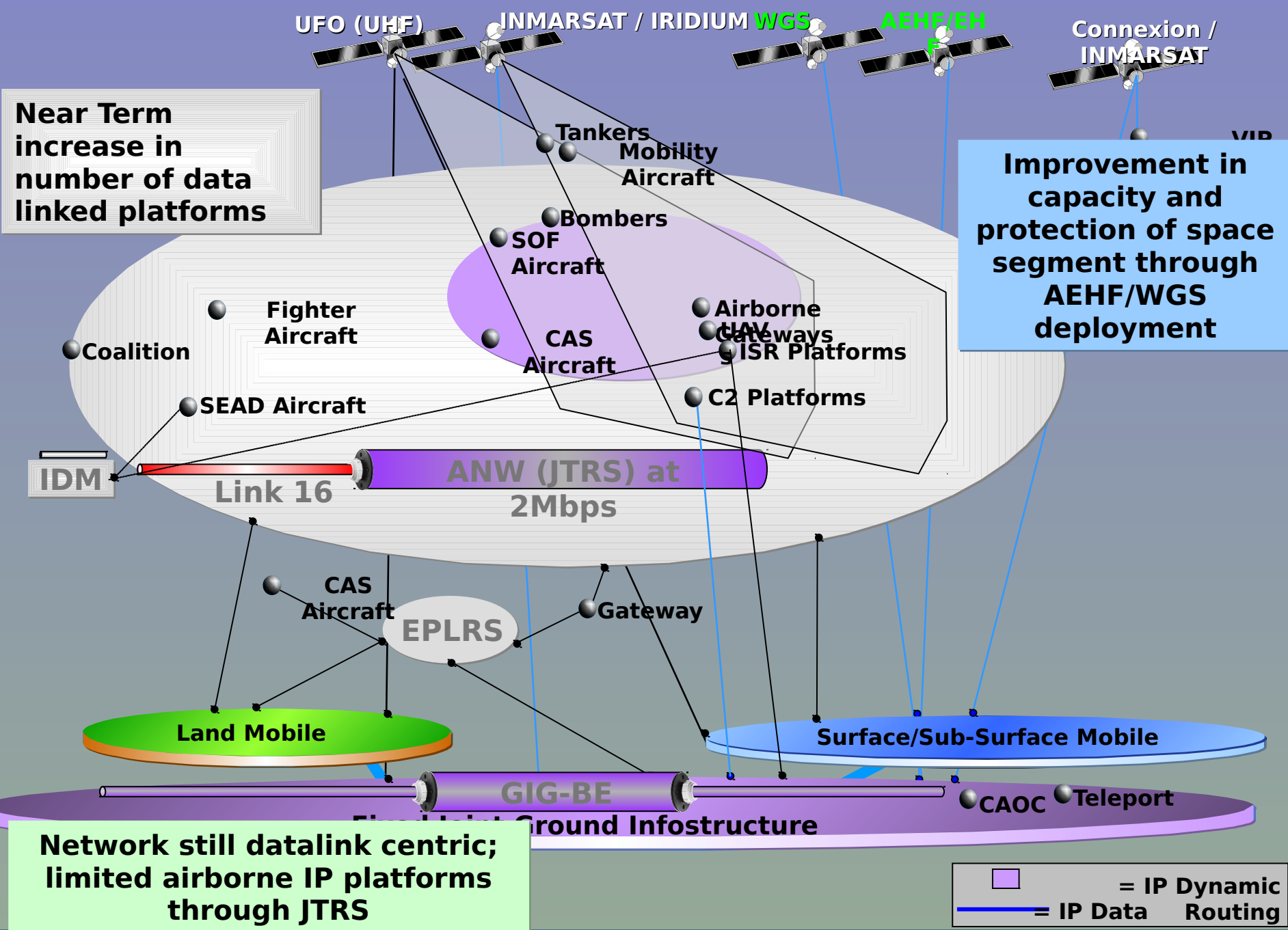
Fixed Joint Ground Infostructure

CAOC Teleport

**Majority of platforms not
connected via data link of any
kind**

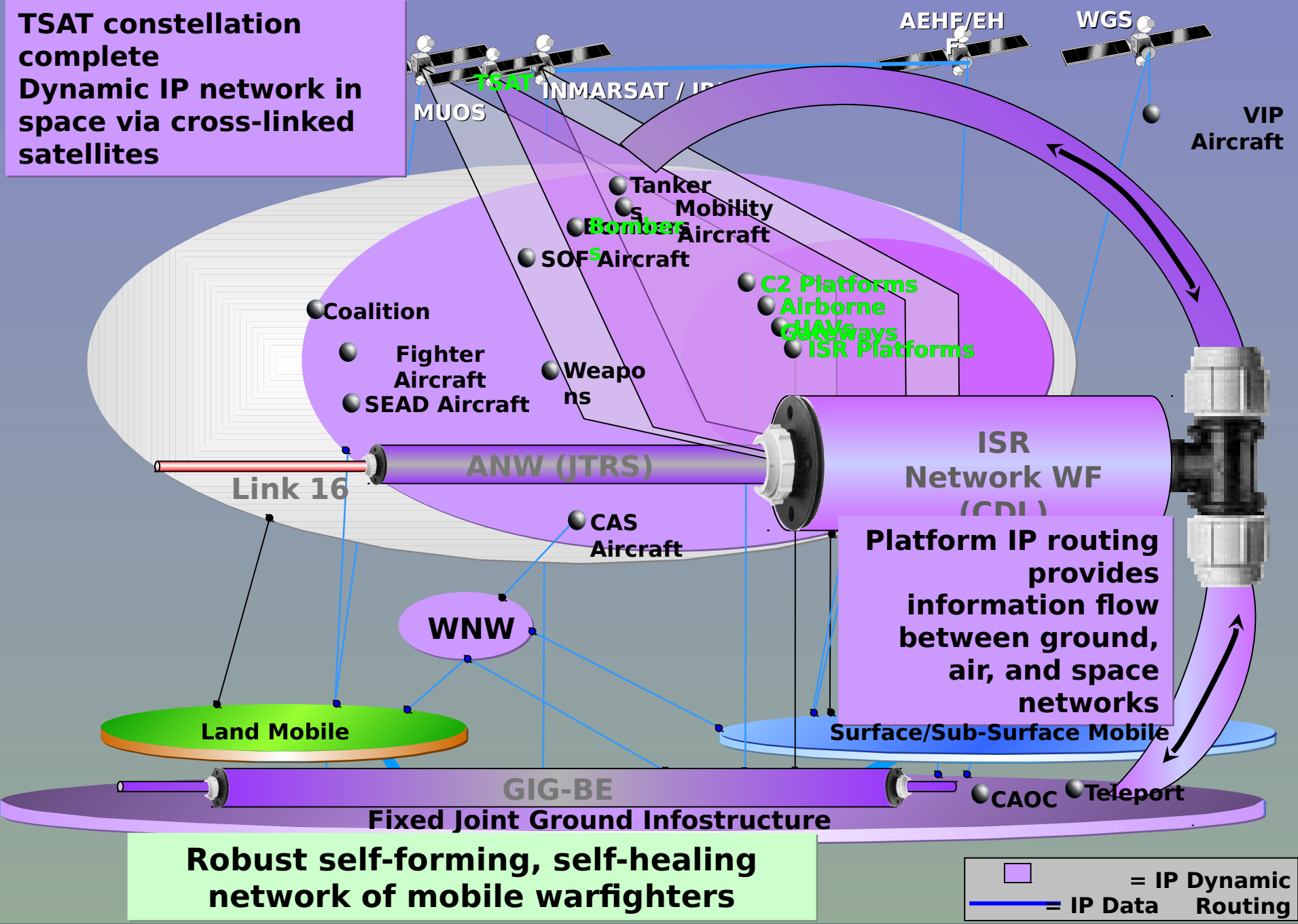
 = IP Dynamic
 = IP Data Routing

FY 05 Constellation Net



FY 09 Constellation Net

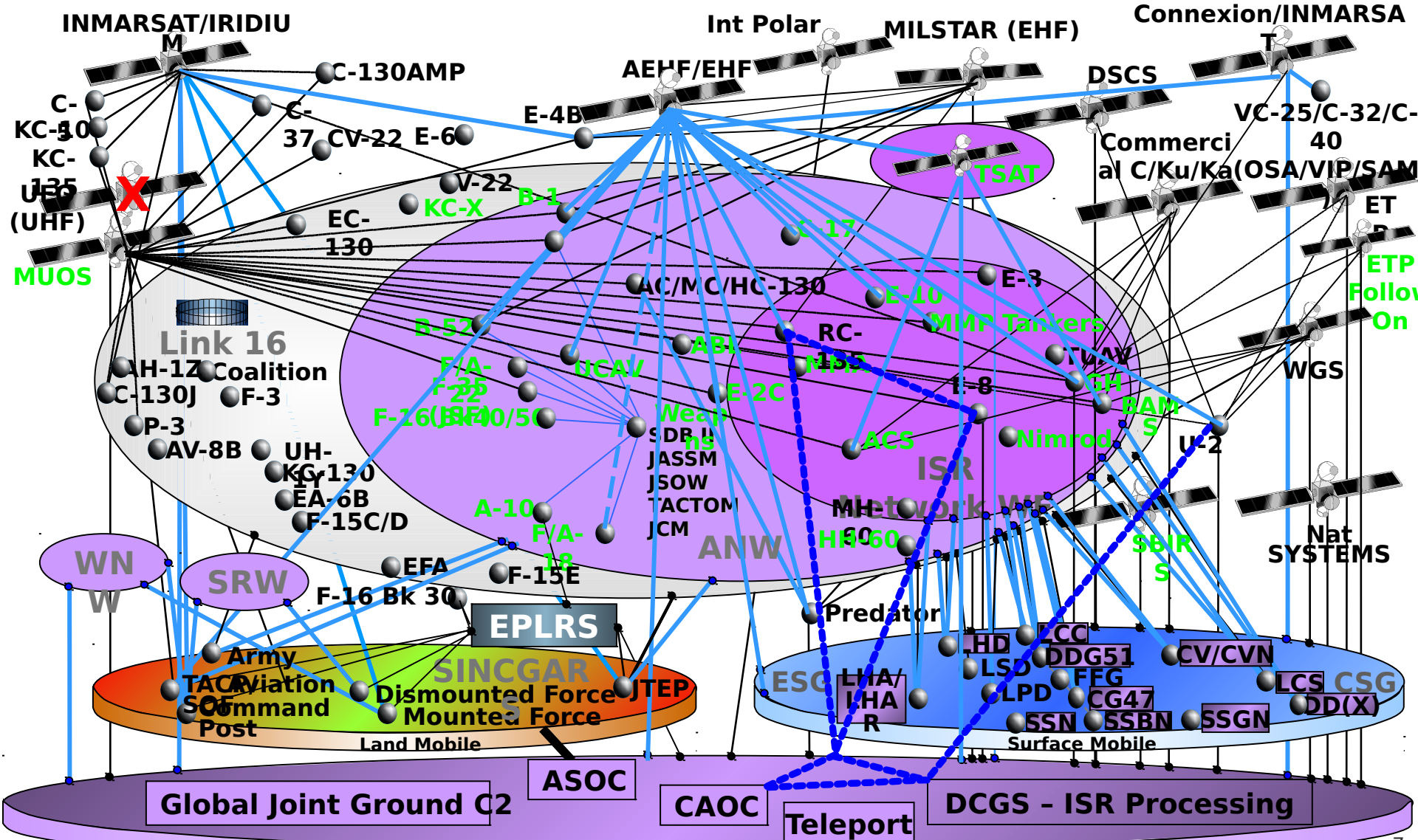
TSAT constellation complete
Dynamic IP network in space via cross-linked satellites



Robust self-forming, self-healing network of mobile warfighters

FY 13-20 Constellation Net

AF/XI Proprietary



Fixed Joint Ground Infostructure

----- = NCCT
 [] = IP Dynamic
 ----- = IP Data Routing
 X
 Grn Txt Decommitted Action

No Significant IP or Data Link Capability:

C-5 C-130AMP KC-10 F-117 KC-135

CV-22 E-6 C-40 AIP MH-53E SH60

HH-60H

Future platforms: E-10 ABL UCAV CV-2

More Aircraft connected via Link 16

Forwarding/gateway via ROBE, JTEP



N-CDL

DCGS



**NETWORK COMMON
DATALINK WAVEFORM**

**FAB-T or AMF JTRS
AVAILABLE: FY13
DATA RATE: 274 Mbps**

ANW

**AIRBORNE NETWORKING
WAVEFORM**

**AMF JTRS, MIDS JTRS
AVAILABLE: FY08
DATA RATE: 2 Mbps**

CAOC



**SOLDIER RADIO
WAVEFORM
(Wireless Handheld)**

**JTRS CLUSTER 5
AVAILABLE: TBD
DATA RATE: 1 Mbps**

**Army UA,
UEx, UEy or
USMC
ground unit**

WNW



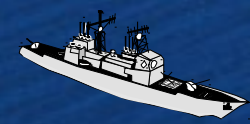
**WIDEBAND NETWORKING
WAVEFORM**

**AMF JTRS, CLUSTERS 1 &
5
AVAILABLE: TBD
DATA RATE: 2 Mbps**

WNW



**CSG/ES
G**



Teleport/NCTAMS

AEHF/WGS/TSAT

MUOS

DCGS

SATCOM CAPABILITIES

MUOS

TERMINALS: CSEL; JTRS;
JTT; MBMMR
DATA RATE: 64 Kbps

AEHF

TERMINALS: SCAMP;
SMART-T; FAB-T
DATA RATE: 8 Mbps

WGS

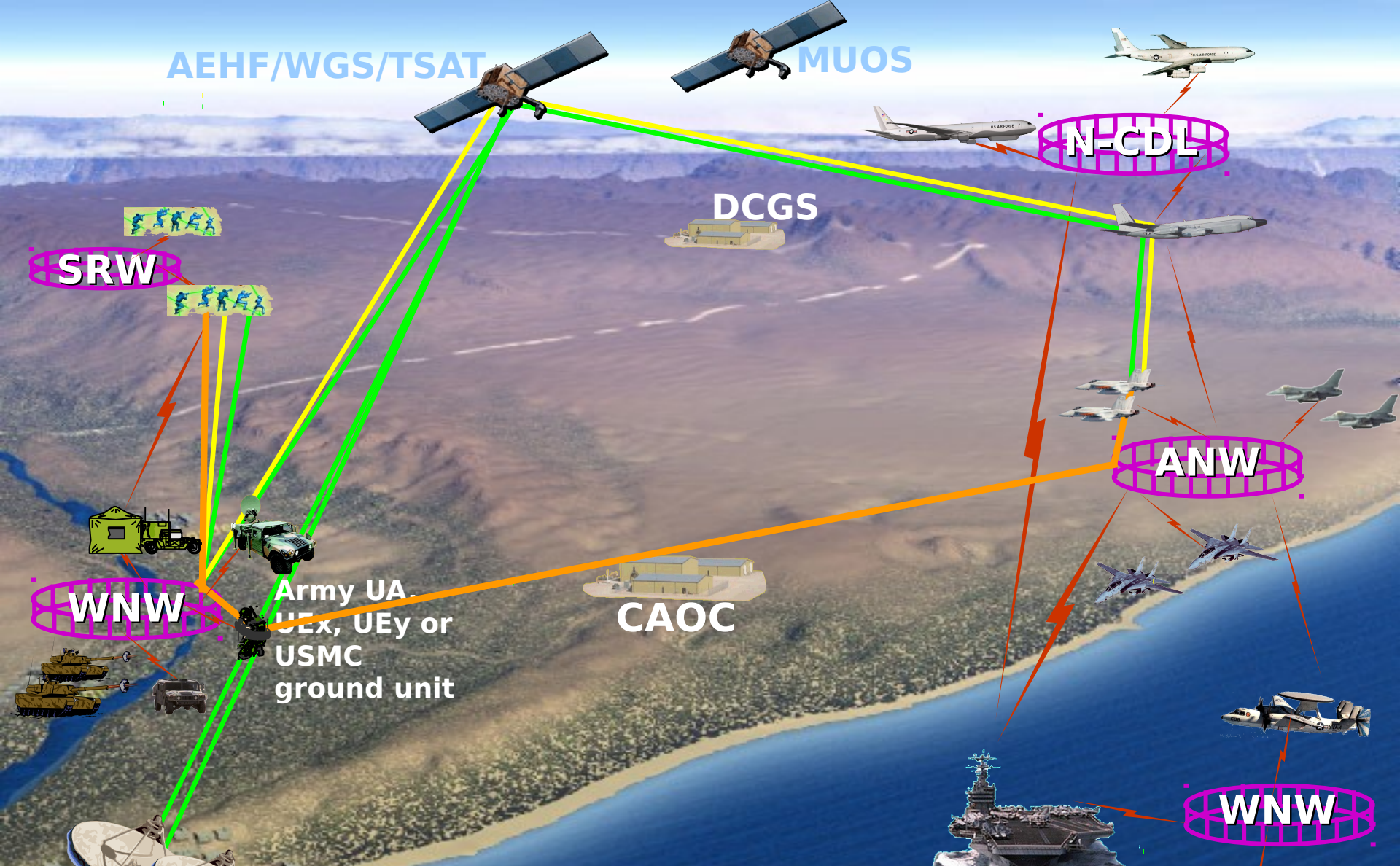
TERMINALS: GMF; LMST;
FAB-T; GMT
DATA RATE: 137 Mbps

TSAT

TERMINALS: FAB-T; GMT
DATA RATE: 45 Mbps - 1
Gbps

Wideband capability at Battalion level and
above on ground; large body aircraft in the air;
ships at sea

Teleport/NCTAMS



Multi-Waveform Radios Kill Many Interoperability Seams!



In Summary



Air Force is fully committed to co-developing integrated capabilities delivering **Joint effects** by significant investment in time, resources, and people to advance **Joint Net-Centric Capability**

Key: Net-Centric Operations

***IP-Based Routing, Shared Data, Assured Service
To Conduct Global Employment & Sustainment Operations***